



Vermont Pursues a Statewide Smart Grid Strategy

Vermont utilities are participating in *eEnergy Vermont*, which is part of a broad “eState Initiative” that includes the electricity, telecommunications and health care sectors throughout the State. *eEnergy Vermont* received a \$138 million Smart Grid Investment Grant (SGIG) including \$69 million in Recovery Act funds from the U.S. Department of Energy (DOE).

Statewide Collaboration

Smart grid investments began in Vermont in 2004 when Vermont Electric Cooperative (VEC) started its smart meter rollout. Thanks to the DOE SGIG project, utilities across Vermont have joined with VEC and are now installing smart meters, communication systems, SCADA systems, and distribution automation equipment including switches, regulators, and circuit monitors.

Participating <i>eEnergy Vermont</i> Utilities	
Burlington Electric Department	Central Vermont Public Service
Green Mountain Power Corporation	Group of Municipal Electric Utilities (GMEU)
Vermont Electric Cooperative	Washington Electric Cooperative

eEnergy Vermont participants are also engaging customers through web portals, in-home displays, programmable communicating thermostats, and time-based rate programs. According to Allen Stamp, *eEnergy Vermont*’s Project Manager, “Statewide collaboration has been a challenge at times to understand the various perspectives of the utilities and shape an agreed upon course of action. But the benefits of collaborating have been substantial.”

eEnergy Vermont’s SGIG project has cut smart grid implementation time in the state in half. Mr. Stamp notes, “We know that without DOE’s funds, several of the State’s utilities would not have been able to deploy smart grid equipment; and without the participation of these utilities, a successful statewide smart grid strategy would not have been possible.”

Vermont Electric Cooperative

Of the *eEnergy Vermont* utilities, VEC is furthest along the smart grid learning curve, having already provided about 80 percent of customers with smart meters before receiving SGIG funding. In 2009, VEC was able to continue its smart grid investments with about \$10 million from the *eEnergy Vermont* project and has been able to extend its initial smart meter rollout to nearly 100 percent of customers and to install automation equipment and SCADA systems on most of its substations.

VEC also installed an outage management system for pinpointing locations when dispatching repair crews. According to Randy Pratt, VEC’s Project Manager, “The payback period for these investments is

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five years, in part through lower meter reading costs, but mostly through improvements in outage management.” Since 2008, when VEC’s outage management system was completed, two key reliability indicators have demonstrated improved performance: the System Average Interruption Frequency Index (SAIFI) decreased 50 percent, and the Customer Average Interruption Duration Index (CAIDI)

decreased 40 percent. VEC’s results from its smart grid investments, including improved reliability, are being studied and replicated by other Vermont utilities in the *eEnergy Vermont* SGIG project.



Over the past six years, VEC’s SAIFI has steadily declined, indicating much-improved reliability.

Source: VEC

The benefits of investing in outage management became clear after the 2011 tropical storm Irene resulted in flooding throughout VEC’s service territory. The storm caused \$1.1 million in damages to VEC’s grid and about 12,000 customers experienced power outages of varying lengths. One initial result of the company’s smart grid investments in outage management at work is highlighted from a blog post by one of VEC’s customers:

At 1:36 p.m. yesterday the lights went out for 1103 customers in South Hero.... No surprise; tropical storm Irene was raging up Vermont. No need to call VEC in a panic, though; I could see immediately from the website that they knew about the outage including the exact number of customers affected. At 8:15 p.m. with the wind still raging, the lights came back on for most of us.... Immediately the outage website showed that 199 South Hero customers were still without power; something must have happened downstream from the original break. Without smart meters, the crews probably wouldn't have known about the second break for quite a while since the people who were cut off by it would have just assumed that the original problem hadn't been fixed yet and wouldn't have called in again until they lost patience or saw their neighbors' lights on.

—from a VEC customer’s blog post

Other customers have recognized recent improvements in reliability. For example, following an outage last winter, VEC CEO David Hallquist said that the utility received “...more than 150 thank you notes from customers for the job we did, and we credit that to the smart grid.”¹ *eEnergy Vermont’s* smart grid efforts benefit not only residences but also businesses, and allows Vermont utilities to play a more supportive role in local economic development. For example, a business in VEC’s service territory is expanding and plans to triple its electric demand from five to fifteen megawatts over the next three years. By employing smart grid approaches to peak load management and energy efficiency, VEC expects to make the business one of the state’s “most efficient electric customers.”

¹ <http://www.vermontelectric.coop/vecs-smart-grid-story>

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VEC project team members monitor activities from the utility's Smart Grid Operations Center.

POWER Magazine provided more formal recognition to VEC in August 2011 by bestowing VEC with its first “POWER Smart Grid” Award.

Workforce Developments

eEnergy Vermont has also provided an opportunity for VEC to make workforce improvements, many of which can be duplicated at other Vermont utilities. According to Mr. Pratt, “We have been able to retain all of our positions, and there have been no significant job losses—even with the economic slowdown and the efficiency improvements from the smart grid investments.”

He added, “We now have a new ‘Substation Automation Group’ comprising four or five new positions, several of which were filled by retraining former meter technicians.”

Future Innovation

Forward thinking about grid modernization in Vermont extends beyond today’s smart equipment and considers what will happen after SGIG. The next horizon for VEC involves innovations in grid management, particularly new ways to engage customers in becoming more active participants in demand response and energy efficiency programs and more educated consumers in controlling their own electricity consumption and costs. “This challenge goes beyond smart meters and grid automation and includes all forms of communications between utilities and customers. For example, we are exploring social media such as Facebook to reach out to customers, explain what we are doing, listen to their ideas, and encourage more neighbor-to-neighbor exchanges.” says Mr. Pratt. VEC is educating consumers—not overpromising benefits but rather speaking frankly about both positives and negatives. The company believes that further innovations for grid modernization depend on open and transparent communication with customers. Through the statewide collaboration provided by the SGIG project, other Vermont utilities can benefit from these innovations.

Learn More

The American Recovery and Reinvestment Act of 2009 provided DOE with \$4.5 billion to fund projects that modernize the Nation’s electricity infrastructure. For more information visit www.smartgrid.gov or www.oe.energy.gov. There are five recent reports available for download:

- *Smart Grid Investment Grant Progress Report, July 2012*
- *Demand Reductions from the Application of Advanced Metering Infrastructure, Time-Based Rates, and Customer Systems – Initial Results, December 2012*
- *Operations and Maintenance Savings from the Application of Advanced Metering Infrastructure – Initial Results, December 2012*

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- *Reliability Improvements from the Application of Distribution Automation Technologies and Systems – Initial Results, December 2012*
- *Application of Automated Controls for Voltage and Reactive Power Management – Initial Results, December 2012*